

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-33 (withdrawn)

34. (currently amended) A method for detecting planarization of a top surface of a ~~multilayer~~ workpiece with features in an electrochemical mechanical deposition process that uses a solution containing a conductor therein and operates upon the top surface ~~multilayer workpiece~~ comprising the steps of:

depositing the conductor to fill the features within the top surface of the workpiece using electrochemical mechanical deposition employing a ~~in the presence of~~ workpiece surface influencing device, an applied potential and the solution ~~using electrochemical mechanical deposition; and~~

~~while depositing the conductor;~~

transmitting a beam of light onto the top surface of the workpiece to obtain a reflected beam of light, a characteristic of the reflected beam of light being altered by a top surface pattern that exists due to the features within the top surface of the workpiece; and

detecting a change in the characteristic of the reflected beam of light indicative of a degree of planarization ~~change in~~ to the top surface ~~pattern~~ of the workpiece.

35. (currently amended) The method according to claim 34 further including ~~wherein~~ the step of terminating ~~detecting a change further includes the step of providing an indicator to halt the electrochemical mechanical deposition step of depositing when~~ at a predetermined degree of

~~planarization the top surface pattern of the workpiece becomes planar, thus indicating the filling of the features with the conductor.~~

36. (currently amended) The method according to claim 35 further including ~~the step of~~ providing for a material removal step ~~after receipt of the indicator.~~

37. (currently amended) The method according to claim ~~35~~ 36 wherein the material removal step performs chemical mechanical processing.

38. (currently amended) The method according to claim ~~35~~ 36 wherein the material removal step performs electrochemical mechanical polishing etching ~~within a same processing area as the step of depositing, and while performing electrochemical mechanical etching; and further~~ comprises the steps:

transmitting another beam of light onto the top surface of the workpiece to obtain another reflected beam of light; and

detecting ~~another~~ a change in a characteristic of the another reflected beam of light indicative of ~~a new~~ another material on the ~~forming a new~~ top surface of the workpiece.

39. (currently amended) The method according to claim ~~34~~ 38 wherein the ~~step of depositing~~ deposits the conductor into features disposed in one of a beam of light and the another beam of light ~~are from a same source top conductive surface of the workpiece and a top insulating surface of the workpiece.~~

40. The method according to claim 34 wherein the characteristic is intensity of the reflected beam of light.

41. The method according to claim 34 wherein the beam of light transmitted onto the top surface of the workpiece passes through the workpiece surface influencing device.

42. The method according to claim 41 wherein the characteristic is intensity of the reflected beam of light.

43. The method according to claim 34 wherein the beam of light transmitted onto the top surface of the workpiece is adjacent to the workpiece surface influencing device.

44. The method according to claim 43 wherein the characteristic is intensity of the reflected beam of light.

45. (currently amended) A method for detecting planarization of a top surface of a ~~multilayer~~ workpiece in an electrochemical mechanical deposition process that uses a solution containing a conductor therein, ~~and operates upon the multilayer workpiece comprising the steps comprising~~ of:

~~operating upon a~~ electrochemically mechanically processing the top surface of the workpiece using a ~~in the presence of~~ workpiece surface influencing device, an applied potential and the solution to deposit material onto the top surface using electrochemical mechanical processing; and

~~while operating upon the top surface of the workpiece:~~

transmitting a beam of light onto the top surface of the workpiece to obtain a reflected beam of light, ~~a characteristic of the reflected beam of light being altered by a top surface pattern that exists due to the features within the top surface of the workpiece; and~~

detecting a change in a characteristic of the reflected beam of light indicative of a change ~~in~~ degree of planarization to the top surface pattern of the workpiece.

46. (currently amended) The method according to claim 44 45 further including wherein the step of terminating the electrochemical mechanical process step at a predetermined degree of planarization of detecting a change ~~further includes the step of providing an indicator to halt the step of operating when the top surface pattern of the workpiece becomes planar.~~

47. (currently amended) The method according to claim 46 further including the step of removing at least a portion of the ~~providing for a material removal step after receipt of the~~ indicator.

48. (currently amended) The method according to claim 47 wherein the ~~material removal step~~ of removing performs chemical mechanical processing.

49. (currently amended) The method according to claim 47 wherein the ~~material removal step~~ of removing performs electrochemical mechanical polishing etching within a same processing area as the step of operating, and further comprises the steps: while performing electrochemical mechanical etching;

transmitting another beam of light onto the top surface of the workpiece to obtain another reflected beam of light; and

detecting ~~another~~ a change in a characteristic of the ~~another~~ reflected beam of light indicative of ~~a new~~ another material ~~forming a new~~ on the top surface of the workpiece.

50. (currently amended) The method according to claim 45 47 wherein ~~the top surface is a top~~ conductive surface of the workpiece and the step of removing performs electrochemical mechanical polishing ~~operating deposits a conductor into features disposed in the top conductive surface of the workpiece.~~

51. (currently amended) The method according to claim 45 wherein portions of the top surface is ~~a top insulator~~ conductive surface of the workpiece and the step of electrochemically mechanically processing ~~operating deposits a conductor into features disposed in the top insulating surface of the workpiece.~~

52. (currently amended) A method for detecting planarization of a top surface of a workpiece having a plurality of features ~~in a deposition process that applies a conductor to a non-planar top surface of the workpiece~~ comprising the steps of:

depositing the conductor to fill the features within the ~~non-planar~~ top surface of the workpiece, ~~thereby causing the non-planar top surface to become more planar over time;~~ and
while ~~depositing the conductor,~~ obtaining a signal ~~that contains information~~ indicative of ~~the~~ a degree of planarity of the top surface ~~conductive layer at various points in time,~~ thereby ~~detecting the non-planar top surface becoming more planar over time.~~

53. (currently amended) The method according to claim 52 wherein the step of obtaining comprises:

transmitting a beam of light onto the top surface of the workpiece to reflect ~~obtain a the~~
~~reflected beam of light, a characteristic of the reflected beam of light being altered by a top surface~~
~~pattern that exists due to the features within the top surface of the workpiece; and~~

detecting ~~the a~~ characteristic of ~~the a~~ reflected beam of light ~~indicative of a change in~~ from
the top surface ~~pattern of the workpiece; and~~

transforming ~~that the~~ characteristic into a ~~the information in the signal, such that a change~~
~~in the detected characteristic at various points in time indicates the non-planar~~ which corresponds
to the degree of planarity of the top surface becoming more planar over time.

54. (currently amended) The method according to claim 53 ~~wherein the step of detecting~~
further including ~~includes the step of providing an indicator to halt the step of depositing~~
terminating the step of depositing when the planarity of the top surface reaches a predetermined
degree ~~pattern of the workpiece becomes planar, thus indicating the filling of the features with the~~
conductor.

55. (currently amended) The method according to claim 54 further including ~~the step of~~
~~providing for a material removal step after receipt of the indicator.~~

56. (currently amended) The method according to claim 54 55 wherein the material removal
step performs electrochemical mechanical processing.

57. (currently amended) The method according to claim 54 55 wherein ~~while performing the~~
material removal step includes:

transmitting another beam of light onto the top surface of the workpiece to obtain another
reflected beam of light; and

detecting ~~another~~ a change in a characteristic of the another reflected beam of light indicative of ~~a new~~ another material ~~forming a new~~ on the top surface of the workpiece.

58. The method according to claim 53 wherein the characteristic is intensity of the reflected beam of light.

59. (currently amended) The method according to claim ~~52~~ 58 wherein the intensity increases ~~as step of depositing deposits the conductor into features disposed in a top conductive surface of~~ the workpiece becomes more planar.

60. (currently amended) The method according to claim ~~52~~ 34 wherein the conductor is copper ~~step of depositing deposits the conductor into features disposed in a top insulating surface of the~~ workpiece.

61. (new) The method according to claim 38 wherein the conductor is copper.

62. (new) The method according to claim 38 wherein the another material is a barrier material.

63. (new) The method according to claim 40 wherein the intensity increases as the degree of planarization increases.

64. (new) The method according to claim 42 wherein the intensity increases as the degree of planarization increases.

65. (new) The method according to claim 47 wherein the step of removing performs chemical mechanical polishing and further comprises the steps:

transmitting another beam of light onto the top surface of the workpiece to obtain another reflected beam of light; and

detecting a change in a characteristic of the another reflected beam of light indicative of another material on the top surface of the workpiece.